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Electric Company Management Information System based on Unified Message Center

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Abstract

Instant Messaging (IM) technology can speed up the workflow and response in user management system since its capacity of reaching target user directly. In this paper, we propose a framework to apply the IM in the information management system in electricity companies based on the unified message center. Based on that center, automatic operation system covers not only user management system but also production, maintain, and custom services will be implemented. We also design a platform to support the proposed message center by efficient saving and analyzing the multiple types of message data such as text, picture, document, video, and audio. Besides the data security policy for the message center is discussed. Experiment system indicates that the proposed framework can improve the management of electricity companies in many aspects such as production, equipment maintains, human resources and etc. by reducing the intermediate links of information transmission and man-made interference.

Keywords: Unified Message Center, Management Information System, Instant Message

1. Introduction

Instant Messaging (IM) technology has been widely applied in the management system of electricity companies. It has improved the performance of data sharing and communications substantially. According to the unified planning requirements of the State Grid Corporation of China, the State Grid Fujian Electric Power Co.,

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Ltd. has officially launched the instant messaging system, which fully covers the main positions of the company's headquarters, local companies, and related affiliates, and has deployed in all of the power companies in Fujian Province. Intranet users are fully connected in the IM system. All employees of the company through the instant messaging system can quickly find contacts, achieve point-to-point communication, group discussions based on text, pictures, documents, audio, video and other forms, which improves the efficiency of daily work communication and reduce communication costs.

The instant messaging system promoted by the State Grid has been widely used on the PC side. However, there are still some gaps in mobilization support, security penetration of internal and external networks, and business system integration. It needs to be promoted through in-depth technology research. Research on instant messaging systems in mobilization and business system integration.

Based on the "message" of automated operation and maintenance applications, the operation and maintenance data and alarm information generated by each operation and maintenance system are analyzed through policy analysis and message processing to realize the intelligent display of message scenarios. With the help of the message center, we can achieve multi-terminal equipment, multi-component applications, fewer interface operations, the less manual intervention of automated operation and maintenance. It is also necessary to research the information storage policy of message center, including multimedia information of text, pictures, documents, videos and voices in the process of communication, and to create a stable, efficient and flexible database storage method. Besides, we study the storage strategies of the historical record for instant messaging applications, realize the on-time destruction of mobile communication records, and the file transfer query of historical communication records in the background for data security reasons.

The rest of the paper is structured as follows. Section 2 introduces related works. The framework of the proposed message center is explained in Section 3. Section 4 gives the experimental results of a demo implementation. Section 5 concludes the whole paper.

2. Related work

Management Information System has been applied to a various application. Kivinen and Lammintakanen [1] described perspectives on information availability and information use among users of a management information system in one specialized healthcare organization. Behl et al. [2] studied the current structure of MIS systems in the microfinance sector and researched on the existing scenario of competition with respect to various vendors offering similar services. Li et al. [3] presented the development of a city-level multi-project management information system to decompose the information processing complexity. Min et al. [4] designed and developed an information management system of geo-drilling construction including eight function modules. Sui et al. [5] implemented the integrated management of the occupational health and safety and environment in an operating nuclear power plant in East China. However, these MIS are mainly based on the PC environment which lacks instant messaging function. In this paper, we will propose a framework based on the message center.

3. Methodology

The communication of message center is performed based on TCP, UDP, and wireless communication. SSL is used to encrypt messages. To support the dynamic adding and removing the message sources, we propose the plugin based data integration framework. Through the combination of core functions and plug-ins, the scalability of the platform is improved to better serve all types of mobile applications. In the message center, a robot server is created to automatically analyze and process the message using automated inspection tools combined with the message alerting mechanism. When an abnormal situation occurs in the equipment or system, the robot is automatically pushed to the designated operation and maintenance engineer through the operation and maintenance monitoring robot. The operation and maintenance engineer responds to the operation and

maintenance instruction, and the operation and maintenance system. The instructions can be executed to achieve automatic inspection, configuration, deployment, exception handling, and resource scheduling.

3.1. Plugin architecture

In order to better support multi-service integration in the enterprise, the application component center follows the plug-in framework theory, and the extension function is stripped from the framework, reducing the complexity of the framework. Extended functions and frameworks are coupled in a very loose manner, and both can be independently changed and released while keeping the interface unchanged. The basic platform establishes the corresponding standards, specifications, and open plug-in interfaces for the transformation of the external interfaces, allowing third parties to expand the functions of the applications through interface modification in accordance with standards and requirements. The Application Component Center is responsible for organizing and managing the download, loading, composition, instantiation, and destruction of components, and provides a complete operational interface for communicating with the back-end services. Figure 1 illustrates the framework of message center based on plugin architecture.

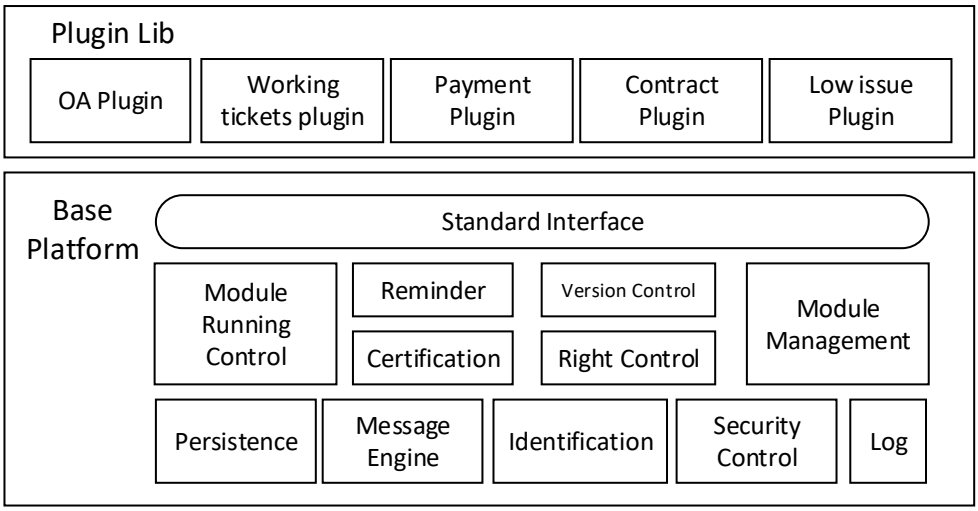

Fig. 1. Framework of the plugin architecture

3.2. Unified Message Center

Using the Unified Messaging Center to provide external message invocation interface specification, it is responsible for packaging the message content and pushing the message to the message server. The message server pushes the message to the corresponding responsible person (PC, mobile terminal). Figure 2 shows the relationship of unified message center with the different applications.

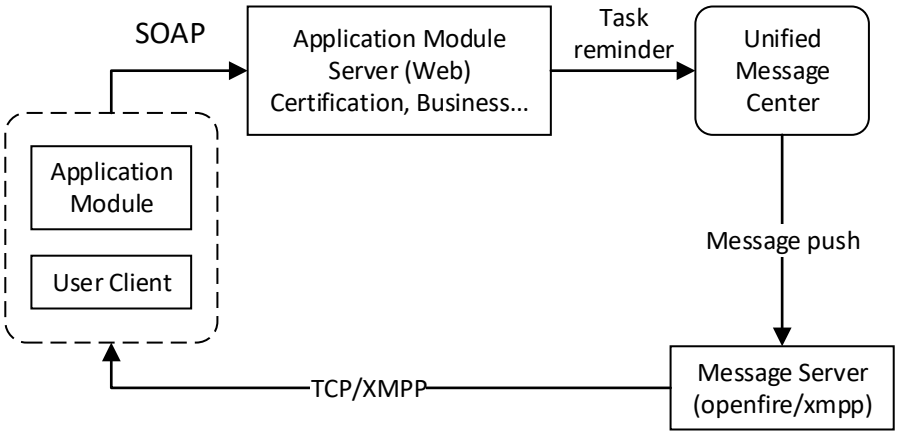

Fig. 2. Unified Message Center

The platform can integrate with the enterprise portal to-do task library, poll the portal to-do task through the to-do query service, and return the task to the client. The platform establishes a “unified waiting center” and formulates corresponding standards and specifications to provide call interfaces. The portal unified to-do service, business component service, third-party system, etc. can call the "unified standby center" service to persist the to-do data in the unified to-do library, and the "unified to-do center" will call the platform message service to wait. The task information is pushed to the client (PC, mobile) in real time, realizing the real-time push of the to-do task. Figure 3 demonstrates the data flow chart of message center based task distribution system.

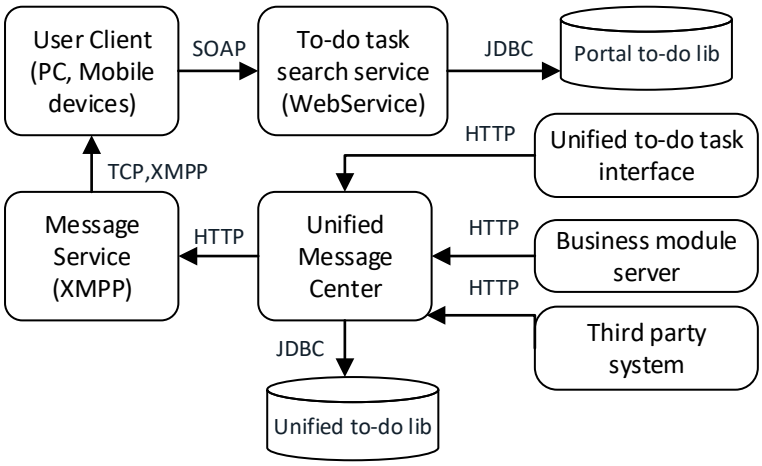

Fig. 3. Task distribution system based on message center

4. Experiment results

4.1. Framework deployment

We implement the proposed framework in an electricity company with around 200 employees. Each of the internal and external networks deploys a set of platform environments and implements isolation of internal and external network information. The information network environment deploys application servers, message servers, component servers (PC business component business processes), file servers, and database servers. There are a total of five types of servers. Each type uses a cluster environment to ensure high availability of the platform. The information external network environment deploys application servers, message servers, micro application servers (mobile terminal service management), file servers, and database servers. There are a total of five types of servers. Each type uses a cluster environment to ensure the high availability of the platform. Figure 4 shows the structure of implemented system.

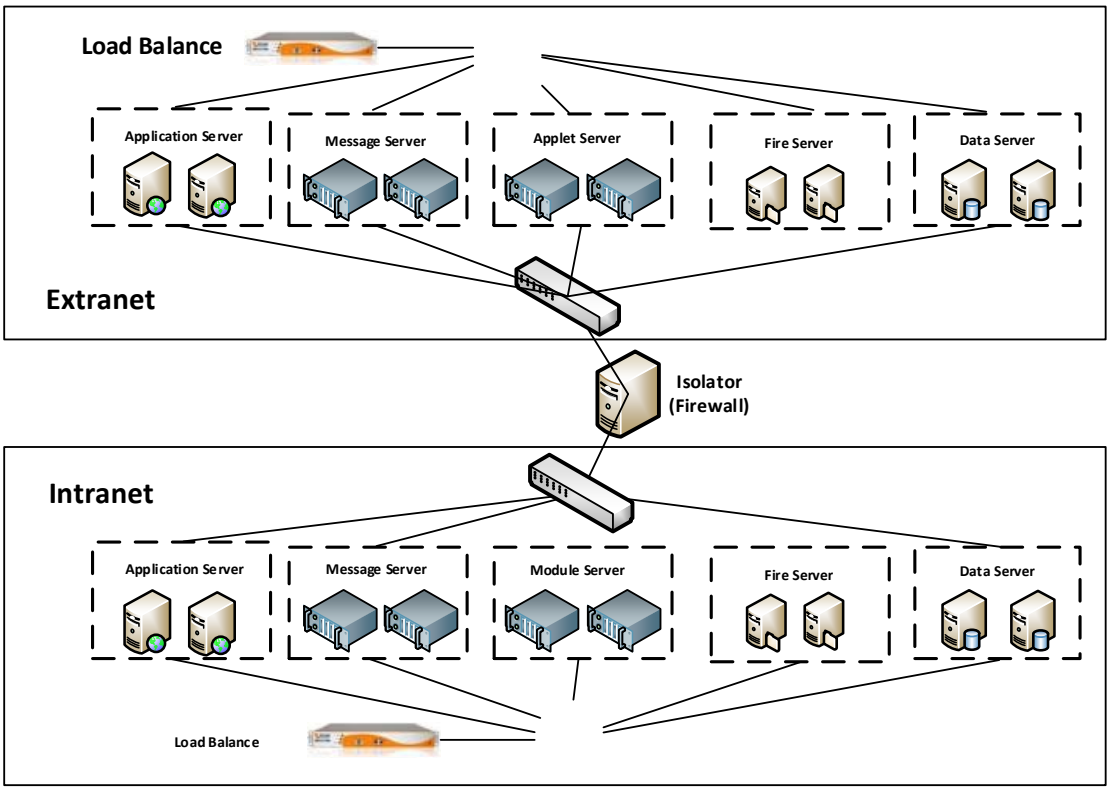

Fig. 4. Implementation System Configuration

4.2. Performance evaluation

The information collection interval for the application system, host, middleware, and database is supported for a minimum of 60 seconds, and the acquisition frequency can be manually set. When the device fails, the time from the collection of the fault data to the system response is no more than 30 seconds.

Reliability. System development and testing process. Carry out test work covering the whole process and the whole business to ensure that the coverage of test cases such as unit testing and integration testing reaches 100%; Conduct special tests and provide relevant test reports on issues such as memory overflow and resource release.

The maximum number of concurrent users running continuously. Continuous operation for 2 hours to ensure stable system operation, the service failure rate does not exceed 0.1%, the average CPU usage is less than 60%, the memory usage rate does not increase significantly, and the memory recovery value is restored after 1 hour. The maximum number of concurrent users with 40% of the total number of concurrent users is 8 hours, ensuring stable system operation, the service failure rate is less than 0.1%, the average CPU usage is less than 60%, and the memory usage is not significantly increased. After 1 hour. Memory recovery initial value.

5. Conclusions

In this paper, we propose the unified message center based electric company information management system to improve the communication and task distribution of production, maintains and etc. The message center is implemented with plugin technology to support multiple resources and further extension. Then the task distribution is carried out with a message robot which can analyze and send the message into users and reply the feedback. Finally, we implement the proposed framework in an electricity company and test its performance. The experiment results prove the efficiency of the framework.

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